

REMARKS

Claims 1-3, 14, and 17-32 are pending. The Final Action dated August 18, 2008 in this Application has been carefully considered. The above amendments and the following remarks are presented in a sincere attempt to place this Application in condition for allowance. Claims 1-3 and 14 have been amended in this Response. Claims 4-13 and 15-16 have been cancelled in this Response. Claims 17-32 have been added in this Response. Reconsideration and allowance are respectfully requested in light of the above amendments and following remarks.

Claims 1, 2, 17, 18, and 19

Claim 1 stands rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Publication No. 2004/0042399 to Bly et al. (“Bly”) in view of U.S. Patent No. 6,553,538 to Fijolek et al. (“Fijolek”). In light of the amendments submitted herewith, Applicants respectfully submit that the rejections have been overcome. Accordingly, Applicants respectfully request that the rejections be withdrawn.

Claim 1 has been amended to recite:

An apparatus for bandwidth management, comprising:

- a plurality of load shapers configured to:
 - maintain a local bandwidth management table comprising a local token count for each of a plurality of classes of source entities;
 - receive a data packet from a source entity belonging to one of the plurality of classes;
 - transmit the data packet over a multiplexed communication path if the local token count for the class of the source entity is at least one; and
 - decrement the local token count for the class of the source entity in the local bandwidth management table in response to the transmission; and
- a Bandwidth Management Controller configured to:
 - maintain a centralized bandwidth management table comprising a base token count for each of the plurality of classes of source entities, wherein a minimum bandwidth is reserved for each of the plurality of classes of source entities and the base token count increases at a rate corresponding to the minimum bandwidth; and wherein:
 - the plurality of load shapers is further configured to request a token for the class of the source entity from the Bandwidth Management Controller in response to the transmission; and

the Bandwidth Management Controller is further configured to respond to the request if the base token count for the class of the source entity is at least one by:
providing a token and decrementing the base token count for the class of the source entity.

Support for this amendment can be found, among other places, at paragraphs [0017]-[0020] and [0023]-[0026] of the specification.

Claim 1 recites: “the plurality of load shapers is further configured to request a token for the class of the source entity from the Bandwidth Management Controller **in response to the transmission.**” (emphasis added). Bly does not disclose a request for a token in response to a transmission of a data packet.

The Office Action cited the burst group credit of Bly as the tokens of Claim 1. The burst groups receive credit over time, rather than requesting a token in response to the transmission of a data packet. Bly paragraph [0019], [0032]-[0036]. Bly states: “burst groups 12, 14, 16 are given a selectable allocation of credit at a steady rate.” Bly paragraph [0019]. Bly paragraphs [0032]-[0036] give an example algorithm for giving credit to burst groups. This algorithm shows burst_credit_a credit being added to the credit for burst_bucket_a every time period N. The transmission of a data packet is not shown as part of the algorithm. Thus, the burst groups in Bly receive credit at a constant rate. The burst groups do not request a token in response to the transmission of a data packet and do not receive credit in response to the transmission of a data packet.

Bly also discloses a plurality of queues which request credit. Bly paragraph [0030]. However, these queues also do not request a token in response to the transmission of a data packet. “A fixed size bandwidth allocation table (BAT) 50 is traversed at a constant rate. Each location (e.g. row) 68-75 (FIG. 6) in the table identifies a queue 44-47 and the amount of credit to allocate to that queue 44-47.” Bly paragraph [0026]. “As the bandwidth allocation table 50 is traversed, the

queue listed in the entry 68-75 requests the credit listed from its assigned burst group or groups.” Bly paragraph [0030]. Bly therefore states that the BAT is traversed at a constant rate and a queue requests credit when an entry in the BAT with the queue identified is traversed. Thus, the queues of Bly request credit at a constant rate.

Further, Bly discloses that, through the entries in the BAT, the amount of credit requested by a queue can vary. Bly figures 6 and 7. However, Bly does not disclose that the amount of credit requested varies in response to the transmission of a data packet.

Applicants therefore submit that amended Claim 1 is clearly and precisely distinguishable over the cited references in a patentable sense, and is therefore allowable over these references. Accordingly, Applicants respectfully request that the rejection of amended Claim 1 under 35 U.S.C. § 103(a) be withdrawn and that Claim 1 be allowed.

Claim 2 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Bly in view of Fijolek. However, Claim 2 depends from and further limits Claim 1. Hence, for at least the aforementioned reasons that Claim 1 should be deemed in condition for allowance, Claim 2 should be deemed in condition for allowance. Applicants respectfully request that the rejection of dependent Claim 2 also be withdrawn.

Claim 2 has been amended to recite:

The apparatus of claim 1, wherein:
the centralized bandwidth management table further comprises a standby token count for each of the plurality of classes of source entities; and
the Bandwidth Management Controller is further configured to respond to the request if the base token count for the class of the source entity is zero and the standby token count for the class of the source entity is at least one by:
providing a token and decrementing the standby token count for the class of the source entity.

Support for this amendment can be found, among other places, at paragraph [0027] of the specification.

Claim 17 has been added in this Response. Support for Claim 17 can be found, among other places, at paragraph [0027] of the specification. Claim 17 depends from and further limits Claim 2. Hence, for at least the aforementioned reasons that Claim 2 should be deemed to be in condition for allowance, Claim 17 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 17 be allowed.

Additionally, Claim 17 recites limitations similar to the limitations of Claim 9, which has been cancelled in this Response. The Office Action cited Hosein column 4, lines 16-33 as disclosing the additional limitations of Claim 9, “the standby BW available is exponentially reduced when congestion is detected; and the available standby BW is linearly increased in a periodic manner when the communication path is not congested.” However, Hosein discloses the use of distributing fractions of tokens to more evenly distribute tokens over an interval. Hosein, column 2, lines 20-35. Hosein does not disclose “exponentially decreas[ing] the standby token count for each of the plurality of source entities when the communication path is congested.” In the cited portion of Hosein, the signal transfer point adds tokens to a token bank. Hosein, column 4, lines lines 24-26. The tokens in the token bank are reduced in two ways. First, tokens are used when messages are sent. Hosein, column 4, lines 34-42. Second, the token bank is reset to a threshold when the number of tokens exceeds the threshold. Hosein, column 4, lines 29-33. Neither reduction is an exponential reduction, and Hosein does not disclose that either reduction occurs if congestion is detected.

Further, Hosein discloses that the supply of tokens is limited to prevent network congestion from occurring. Hosein, column 1, line 43 to column 2, line 1. Thus, Hosein does disclose detection

of network congestion. Hosein does not disclose exponentially decreasing a token count when a communication path is congested.

Claim 18 has been added in this Response. Support for Claim 18 can be found at figure 4. Claim 18 depends from and further limits Claim 1. Hence, for at least the aforementioned reasons that Claim 1 should be deemed to be in condition for allowance, Claim 18 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 18 be allowed.

Claim 19 has been added in this Response. Support for Claim 19 can be found at paragraph [0028] of the specification and figure 4. Claim 19 depends from and further limits Claim 1. Hence, for at least the aforementioned reasons that Claim 1 should be deemed to be in condition for allowance, Claim 19 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 19 be allowed.

Claims 3, 20, 21, 22, and 23

Claim 3 stands rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Publication No. 2004/0042399 to Bly et al. (“Bly”) in view of U.S. Patent No. 7,006,440 to Agrawal et al. (“Agrawal”). In light of the amendments submitted herewith, Applicants respectfully submit that the rejections have been overcome. Accordingly, Applicants respectfully request that the rejections be withdrawn.

Claim 3 has been amended to recite:

A method of bandwidth management, comprising:

- maintaining a centralized bandwidth management table comprising a base token count for each of a plurality of classes of source entities, wherein a minimum bandwidth is reserved for each of the plurality of classes of source entities and the base token count increases at a rate corresponding to the minimum bandwidth;

- maintaining a local bandwidth management table comprising a local token count for each of the plurality of classes of source entities;

- receiving a data packet from a source entity belonging to one of the plurality of classes;

transmitting the data packet over a multiplexed communication path if the local token count for the class of the source entity is at least one;
decrementing the local token count for the class of the source entity in the local bandwidth management table in response to the transmission;
requesting a token for the local token count for the class of the source entity in response to the transmission; and
if the base token count for the class of the source entity is at least one, providing the requested token and decrementing the base token count for the class of the source entity.

Support for this amendment can be found, among other places, at paragraphs [0017]-[0020] and [0023]-[0026] of the specification.

Claim 3 recites: “requesting a token for the local token count for the class of the source entity **in response to the transmission.**” (emphasis added). Bly does not disclose a request for a token in response to a transmission of a data packet. Why Bly does not disclose a request for a token in response to a transmission of a data packet is discussed in the remarks for Claim 1 and incorporated herein.

Applicants therefore submit that amended Claim 3 is clearly and precisely distinguishable over the cited references in a patentable sense, and is therefore allowable over these references. Accordingly, Applicants respectfully request that the rejection of amended Claim 3 under 35 U.S.C. § 103(a) be withdrawn and that Claim 3 be allowed.

Claim 20 has been added in this Response. Support for Claim 20 can be found, among other places, at paragraph [0027] of the specification. Claim 20 depends from and further limits Claim 3. Hence, for at least the aforementioned reasons that Claim 3 should be deemed in condition for allowance, Claim 20 should be deemed in condition for allowance. Applicants respectfully request that Claim 20 be allowed.

Claim 21 has been added in this Response. Support for Claim 21 can be found, among other places, at paragraph [0027] of the specification. Claim 21 depends from and further limits Claim

20. Hence, for at least the aforementioned reasons that Claim 20 should be deemed to be in condition for allowance, Claim 21 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 21 be allowed.

Additionally, Claim 21 recites limitations similar to the limitations of Claim 9, which has been cancelled in this Response. Why Hosein does not disclose “exponentially decreasing the standby token count for each of the plurality of source entities when the communication path is congested” is discussed in the remarks for Claim 17 and incorporated herein.

Claim 21 has been added in this Response. Support for Claim 21 can be found at figure 4. Claim 21 depends from and further limits Claim 20. Hence, for at least the aforementioned reasons that Claim 20 should be deemed to be in condition for allowance, Claim 21 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 21 be allowed.

Claim 22 has been added in this Response. Support for Claim 22 can be found at paragraph [0028] of the specification and figure 4. Claim 22 depends from and further limits Claim 3. Hence, for at least the aforementioned reasons that Claim 3 should be deemed to be in condition for allowance, Claim 22 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 22 be allowed.

Claims 24, 25, 26, 27, and 28

Claim 24 has been added in this Response. Support for Claim 24 can be found, among other places, at paragraphs [0017]-[0020] and [0023]-[0026] of the specification. Claim 24 recites: “computer code for requesting a token for the local token count for the class of the source entity **in response to the transmission.**” (emphasis added). Bly does not disclose a request for a token in response to a transmission of a data packet. Why Bly does not disclose a request for a token in

response to a transmission of a data packet is discussed in the remarks for Claim 1 and incorporated herein.

Applicants therefore submit that Claim 24 is clearly and precisely distinguishable over the cited references in a patentable sense, and is therefore allowable over these references. Accordingly, Applicants respectfully request that Claim 24 be allowed.

Claim 25 has been added in this Response. Support for Claim 25 can be found, among other places, at paragraph [0027] of the specification. Claim 25 depends from and further limits Claim 24. Hence, for at least the aforementioned reasons that Claim 24 should be deemed in condition for allowance, Claim 25 should be deemed in condition for allowance. Applicants respectfully request that Claim 25 be allowed.

Claim 26 has been added in this Response. Support for Claim 26 can be found, among other places, at paragraph [0027] of the specification. Claim 26 depends from and further limits Claim 25. Hence, for at least the aforementioned reasons that Claim 25 should be deemed to be in condition for allowance, Claim 26 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 26 be allowed.

Additionally, Claim 26 recites limitations similar to the limitations of Claim 9, which has been cancelled in this Response. Why Hosein does not disclose “computer code for exponentially decreasing the standby token count for each of the plurality of source entities when the communication path is congested.” is discussed in the remarks for Claim 17 and incorporated herein.

Claim 27 has been added in this Response. Support for Claim 27 can be found at figure 4. Claim 27 depends from and further limits Claim 24. Hence, for at least the aforementioned reasons

that Claim 24 should be deemed to be in condition for allowance, Claim 27 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 27 be allowed.

Claim 28 has been added in this Response. Support for Claim 28 can be found at paragraph [0028] of the specification and figure 4. Claim 28 depends from and further limits Claim 24. Hence, for at least the aforementioned reasons that Claim 24 should be deemed to be in condition for allowance, Claim 28 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 28 be allowed.

Claims 14, 29, 30, 31, and 32

Claim 14 stands rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 7006440 to Agrawal et al. (“Agrawal”) in view of U.S. Patent No. 6,570,847 to Hosein et al. (“Hosein”) in further view of U.S. Patent No. 7,224,671 to Lee et al. (“Lee”). In light of the amendments submitted herewith, Applicants respectfully submit that the rejections have been overcome. Accordingly, Applicants respectfully request that the rejections be withdrawn.

Claim 14 has been amended to recite:

A method of bandwidth management, comprising:
submitting a request, from a bandwidth managed first entity, for a given bandwidth to an assignment entity;
assigning a unique class identity and a designated allowable bandwidth from said assignment entity;
supplying said assigned unique class identity and designated allowable bandwidth from said assignment entity to a plurality of load shaping entities interconnected to a bus;
maintaining a centralized count of tokens corresponding to said allowable bandwidth for said class identity;
sending a first data packet from said first entity to a first load shaping entity in said plurality of load shaping entities for transmission on the bus, said first data packet providing class priority information including said unique identity;
transmitting said first data packet over said bus by said first load shaping entity if said first load shaping entity has at least one token for said class identity;
removing a token from said first load shaping entity in response to the transmission of said first data packet;

requesting an additional token from the centralized count by the first load shaping entity in response to the transmission of said first data packet; and
permitting transmission of best efforts data packets over said bus by unmanaged entities when no managed bandwidth entity data packets await transmission.

Support for this amendment can be found, among other places, at paragraphs [0017]-[0020] and [0023]-[0026] of the specification.

Claim 14 recites: “requesting an additional token from the centralized count by the first load shaping entity **in response to the transmission of said first data packet.**” (emphasis added). Agrawal, Hosein, and Lee do not disclose requesting an additional token in response to a transmission of a data packet.

Agrawal does not disclose the use of tokens. Rather, Agrawal discloses the use of average queue occupancy for a customer to determine the dropping of packets from that customer. Agrawal, column 8, lines 38-59. Hosein discloses the use of tokens, but discloses adding the tokens to a token bank at a fixed rate. Hosein, column 3, lines 20-35. Lee also discloses the use of tokens. Lee column 11, lines 15-20. However, Lee also discloses adding the tokens at a fixed rate. Lee, column 10, lines 52-64.

Further, Bly does not disclose requesting an additional token in response to a transmission of a data packet. Why Bly does not disclose a request for a token in response to a transmission of a data packet is discussed in the remarks for Claim 1 and incorporated herein.

Applicants therefore submit that amended Claim 14 is clearly and precisely distinguishable over the cited references in a patentable sense, and is therefore allowable over these references. Accordingly, Applicants respectfully request that the rejection of amended Claim 14 under 35 U.S.C. § 103(a) be withdrawn and that Claim 14 be allowed.

Claim 29 has been added in this Response. Support for Claim 29 can be found at Claim 4 of the application as originally filed. Claim 28 depends from and further limits Claim 14. Hence, for at least the aforementioned reasons that Claim 14 should be deemed to be in condition for allowance, Claim 28 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 28 be allowed.

Claim 30 has been added in this Response. Support for Claim 30 can be found, among other places, at paragraphs [0016]-[0017] and [0021] and figure 1 of the application as originally filed. Claim 30 depends from and further limits Claim 14. Hence, for at least the aforementioned reasons that Claim 14 should be deemed to be in condition for allowance, Claim 30 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 30 be allowed.

Additionally, Claim 30 recites:

the communication path is a bus;
the first entity is a computer application being processed simultaneously by:
 a first processing unit coupled to the first load shaping entity; and
 a second processing unit coupled to a second load shaping entity in said plurality of load shaping entities.

None of Bly, Fijolek, Agrawal, Hosein, and Lee teach these limitations. All of the cited references relate to computer networks, but none of the cited references discloses data packets sent from a computer application being processed simultaneously by a first processing unit and a second processing unit. Claim 30 recites “a computer application processed simultaneously by: a first processing unit... and a second processing unit...” which “submit[s] a request...for a given bandwidth to an assignment entity.” “[S]aid assigned unique class identity and designated allowable bandwidth” is supplied “from said assignment entity to a plurality of load shaping entities interconnected to” a bus. A first load shaping entity and a second load shaping entity are “in said plurality of load shaping entities.” “[The] first processing unit is coupled to the first load shaping

entity” and “[the] second processing unit is coupled to the second load shaping entity.” This combination of elements is not found in any of the cited references because none of the cited references emphasizes the processing of a computer application which sends a data packet.

Claim 31 has been added in this Response. Support for Claim 31 can be found, among other places, at paragraphs [0016]-[0017] and [0021] and figure 1 of the application as originally filed. Claim 31 depends from and further limits Claim 30. Hence, for at least the aforementioned reasons that Claim 30 should be deemed to be in condition for allowance, Claim 31 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 31 be allowed.

Claim 32 has been added in this Response. Support for Claim 32 can be found, among other places, at paragraphs [0016] and [0021] and figure 1 of the application as originally filed. Claim 32 depends from and further limits Claim 31. Hence, for at least the aforementioned reasons that Claim 31 should be deemed to be in condition for allowance, Claim 32 should be deemed to be in condition for allowance. Applicants respectfully request that Claim 32 be allowed.

Additionally, Claim 32 recites:

said first data packet is transmitted to a first device, said first device being part of the same computer system as said first entity; and

said second data packet is transmitted to a second device, said second device being part of the same computer system as said first entity.

None of Bly, Fijolek, Agrawal, Hosein, and Lee teach these limitations. All of the cited references are directed to data transmitted across a computer network, rather than within the same computer system. Thus, none of the cited references discloses “a computer application being processed simultaneously by multiple processing units” which transmits a first data packet to a first device, the first device being part of the same computer system as the application, or which

transmits a second data packet to a second device, the second device being part of the same computer system as the application.

Applicants have now made an earnest attempt to place this Application in condition for allowance. For the foregoing reasons and for other reasons clearly apparent, Applicants respectfully request full allowance of Claims 1-3, 14, and 17-32.

Applicant would like to bring to the attention of the Examiner for consideration, an Information Disclosure Statement filed concurrently with this response.

Applicants hereby request continued examination and hereby authorize the Director to charge the required fee to Deposit Account No. 09-0447 of IBM Corporation. Applicants further request an extension of time for making this reply and authorize the Director to charge the required fee to Deposit Account No. 50-0605 of CARR LLP. Applicants do not believe that any other fees are due; however, in the event that any other fees are due, the Director is hereby authorized to charge any required fees due (other than issue fees), and to credit any overpayment made, in connection with the filing of this paper to Deposit Account No. 50-0605 of CARR LLP.

Should the Examiner deem that any further amendment is desirable to place this application in condition for allowance, the Examiner is invited to telephone the undersigned at the number listed below.

Respectfully submitted,

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